
Maintenance

Routine maintenance consists of enabling and disabling MSDL cards and downloading new versions of peripheral software. These activities are performed by an authorized person such as a Meridian 1 administrator.

Troubleshooting the MSDL consists of determining problem types, isolating problem sources, and solving the problem. A craftsperson normally performs these activities.

Meridian 1 systems have self-diagnostic indicators as well as software and hardware tools. These diagnostic facilities simplify MSDL troubleshooting and reduce mean-time-to-repair (MTTR). For complete information concerning Meridian 1 maintenance, refer to *Meridian 1 general maintenance information* (553-3001-500).

For complete information regarding X11 software maintenance programs, refer to *X11 input/output guide* (553-3001-400).

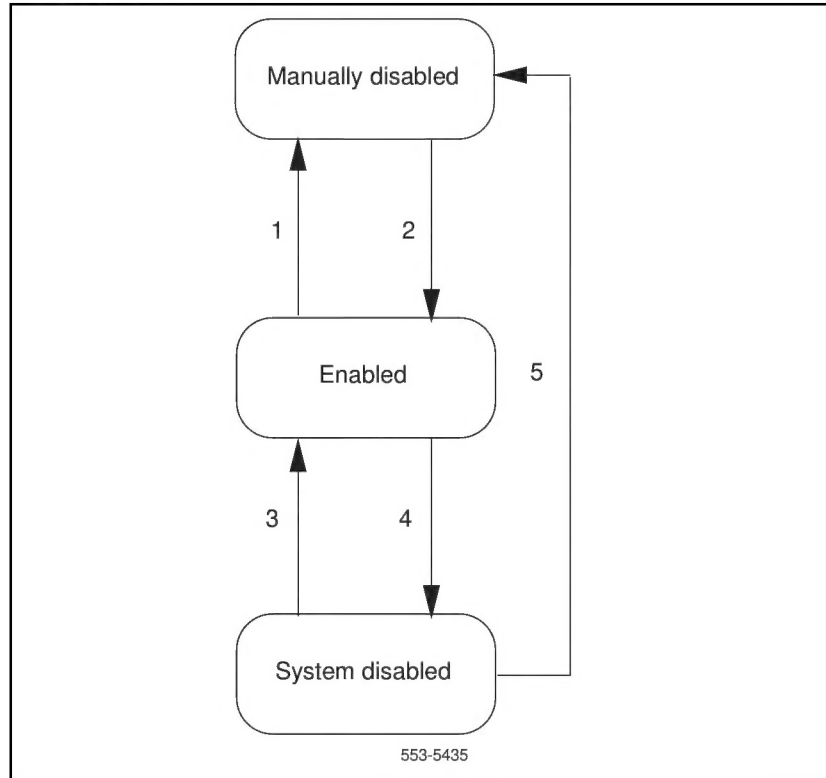
MSDL states

MSDL states are controlled manually by maintenance programs or automatically by the system. [Figure 7](#) shows MSDL states and the transitions among them. These are the three states the MSDL may be in:

- Manually disabled
- Enabled
- System disabled

The following sections describe the relationships between these states.

Figure 7
MSDL states



Manually disabled

In this state, the MSDL is not active. The system does not attempt to communicate or attempt any automatic maintenance on the MSDL.

A newly configured MSDL automatically enters the manually disabled state. An operating MSDL can be manually disabled by issuing the **DIS MSDL x** command in LD 37 (step 1 in [Figure 7](#)).

Entering the **DIS MSDL x** command in LD 37 moves the card to manually disabled status and stops all system communication with the card (step 5 in [Figure 7](#)).

Manually enabled

When the card has been manually disabled, reenable it with the **ENL MSDL x** command in LD 37 (step 2 in [Figure 7](#)).

System disabled

When the Meridian 1 disables the MSDL card (step 4 in [Figure 7](#)), it continues to communicate and attempt maintenance procedures on the card. To stop all system communication with the card, enter **DIS MSDL x** to disable it (step 5 in [Figure 7](#)). Otherwise, the system periodically tries to enable the card, attempting recovery during the midnight routines (step 3 in [Figure 7](#)).

The system disables the MSDL if the card

- exhibits an overload condition
- does not respond to system messages
- is removed
- resets itself
- encounters a fatal error
- is frequently system disabled and recovered

When an MSDL is system disabled, a substate indicates why the MSDL is disabled. These are the substates:

- **Not Responding** Meridian 1 cannot communicate with the MSDL.
- **Self-Testing** The MSDL card is performing self-tests.
- **Self-tests Passed** The MSDL card successfully completed self-tests and Meridian 1 is determining if download is required or the software downloading is complete.
- **Self-tests Failed** The MSDL card self-tests failed.
- **Shared RAM Tests Failed** The Meridian 1 failed to read/write to the MSDL shared RAM.
- **Overload** Meridian 1 received an excessive number of messages within a specified time period.
- **Reset Threshold** Meridian 1 detected more than four resets within 10 minutes.
- **Fatal Error** The MSDL card encountered a fatal condition from which it cannot recover.
- **Recovery Threshold** The MSDL card was successfully enabled by the MSDL autorecovery function five times within 30 minutes. Each time it was system disabled because of a problem encountered during operation.
- **Bootloading** The MSDL base software is in the process of being downloaded to the MSDL.

Detailed information on system disabled substates and the action required for each substate appears in “Troubleshooting actions” on page 37.

Maintaining the MSDL

The Meridian 1 system controls automatic MSDL maintenance functions. A craftsperson or system administrator performs manual maintenance by changing the card status, downloading new versions of peripheral software, or invoking self-tests.

System controlled maintenance

Built-in diagnostic functions constantly monitor and analyze the system and individual card, performing the following operations:

- using autorecovery to automatically correct a temporarily faulty condition and maintain the system and its components
- printing information and error messages to indicate abnormal conditions that caused a temporary or an unrecoverable error

During system initialization, the Meridian 1 examines the MSDL base code. If the base code needs to be downloaded, the Meridian 1 CPU resets the MSDL card and starts downloading immediately following initialization. At the same time, all other MSDL peripheral software programs are checked and, if they do not correspond to the system disk versions, the correct ones are downloaded to the card.

If manual intervention is required during initialization or operation, information and error messages appear on the console or the system TTY to suggest the appropriate action. For a complete discussion of the information and error messages, refer to *X11 input/output guide* (553-3001-400). Detailed information of system disabled substates and the action required for each substate is found at the end of this document.

Manually controlled maintenance

Use manual maintenance commands found in the following programs to enable, disable, reset, get the status of, and perform self-tests on the MSDL card:

- Input/Output Diagnostic Program LD 37
- Program LD 42
- Link Diagnostic Program LD 48
- PRI D-channel Diagnostic Program LD 96

For a complete discussion of these programs, refer to *X11 input/output guide* (553-3001-400).

Note 1: Enter commands after the dot (.) prompt.

Note 2: The “**x**” in the commands below represents the DNUM value of the card number.

Enabling the MSDL

Enter **ENL MSDL x** to enable the MSDL manually. If the MSDL base code has not been previously downloaded or if the card version is different from the one on the system disk, the software is downloaded and the card is enabled.

To force software download and enable the card, enter **ENL MSDL x FDL**. This command forces the download of the MSDL base code and the configured peripheral software even if it is already resident on the card. The card is then enabled.

To enable a disabled MSDL and its ports, enter **ENL MSDL x ALL**. This command downloads all peripheral software (if required) and enables any configured ports on the card. This command can be issued to enable some manually disabled ports on an already enabled MSDL.

Disabling the MSDL

To disable an MSDL card, enter **DIS MSDL x**.

To disable the MSDL and all its ports, enter **DIS MSDL x ALL**.

Resetting the MSDL

To reset an MSDL and initiate a limited self-test, the MSDL must be in a manually disabled state. To perform the reset, enter **RST MSDL x**.

Displaying MSDL status

To display the status of all MSDL cards in Meridian 1, enter **STAT MSDL**.

To display the status of a specific MSDL, enter **STAT MSDL x**. The status of the MSDL, its ports, and the operation of each port appears.

The command **STAT MSDL x FULL** displays all information about an MSDL (card ID, bootload firmware version, base code version, base code state, operation state, date of base code activation) as well as the version, state, and activation date for each card operation.

Self-testing the MSDL

To perform extensive self-testing of an MSDL, enter **SLFT MSDL x**. This test can be activated if the card is in the manually disabled state. If the test passes, the Meridian 1 outputs the card ID and a pass message. If it fails, the system displays a message indicating which test failed.

Manually isolating and correcting faults

Problems are due to configuration errors that occur during installation or hardware faults resulting from component failure during operation. See “Symptoms and actions” on page 37 for more information on problem symptoms and required responses.

Isolate MSDL faults using the diagnostic tools described below:

- 1 Observe and list the problem symptoms; for example, a typical symptom is a permanently lit LED.
- 2 If the LED flashes three times but the card does not enable, verify that the card is installed in a proper slot as shown in Table 1, “MSDL card location,” on page 12.
- 3 Check that the address is unique; no other card in the system can be physically set to the same device number as the MSDL.
- 4 If installation is correct and no address conflict exists, refer to [“Newly installed MSDL cards” on page 34](#) or [“Previously operating MSDL cards” on page 35](#).
- 5 If the MSDL still does not operate correctly, contact your Northern Telecom representative.

Newly installed MSDL cards

Problems that occur during MSDL card installation usually result from improperly installed, incorrectly addressed, or faulty cards.

If the LED on a newly installed MSDL does not flash three times after insertion, wait 5 minutes, then remove and reinsert. If the LED still does not flash three times, the card is faulty.

Previously operating MSDL cards

Problems that occur during normal operation usually result from faulty cards. Follow these steps to evaluate the situation:

- 1 Use the **STAT MSDL x** command to check MSDL card status. See [“Displaying MSDL status” on page 33](#).
- 2 If the card has been manually disabled, try to enable it using **ENL MSDL x**. See [“Enabling the MSDL” on page 32](#). If this fails, perform self-testing as described in step 4.
- 3 If the card has been disabled by the system, disable it manually with **DIS MSDL x**. See [“Disabling the MSDL” on page 33](#).
- 4 Invoke self-testing with the **SLFT MSDL x** command. See [“Self-testing the MSDL” on page 33](#). If self-tests fail, replace the card. If self-tests pass, try to enable the card again, as in step 2. If the card does not enable, note the message output to the TTY and follow the recommended action.

Replacing MSDL cards

After completing MSDL troubleshooting you may determine that one or more MSDL cards are defective. Remove the defective cards and replace them with new ones.

An MSDL card can be removed from and inserted into a Meridian 1 module without turning off the power to the module. Follow these steps:

- 1 Log in on the maintenance terminal.
- 2 At the **>** prompt, type **LD 37** (you can also use LD 42, LD 48, or LD 96) and press Enter.
- 3 Type **DIS MSDL x ALL** and press Enter to disable the MSDL and any active operations running on one or more of its ports. The MSDL card is now disabled.
- 4 Disconnect the cables from the MSDL faceplate connectors.
- 5 Unlatch the card-locking devices, and remove the card from the module.
- 6 Set the switches on the replacement card to match those on the defective card.
- 7 Insert the replacement card into the same card slot.
- 8 Observe the red LED on the front panel during self-test. If it flashes three times and stays on, it has passed the test. Go to step 8.

If it does not flash three times and then stay on, it has failed the test. Pull the MSDL partially out of the module and reinsert it firmly into the module. If the problem persists, troubleshoot or replace the MSDL.

- 9 Connect the cables to the MSDL faceplate connectors.
- 10 At the **.** prompt in the **LD 37** program, type **ENL MSDL x ALL** and press Enter to enable the MSDL and its operations. If the red LED on the MSDL turns off, the MSDL is functioning correctly. Since self-tests were not invoked, no result message appears.
- 11 Tag the defective card(s) with a description of the problem and return them to your Northern Telecom representative.